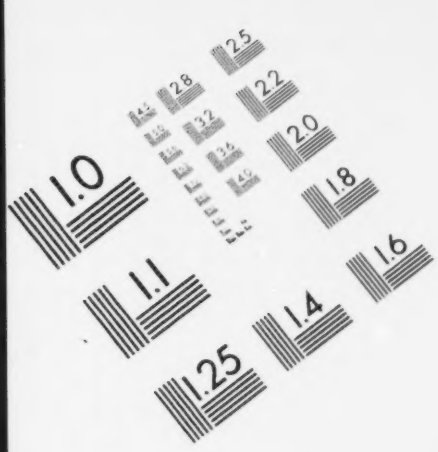
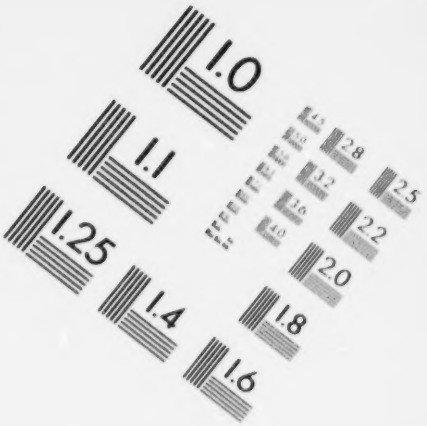
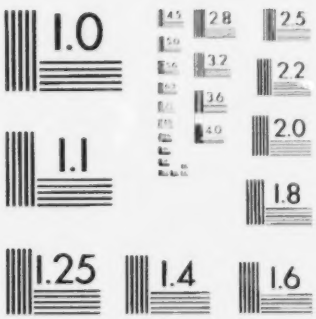


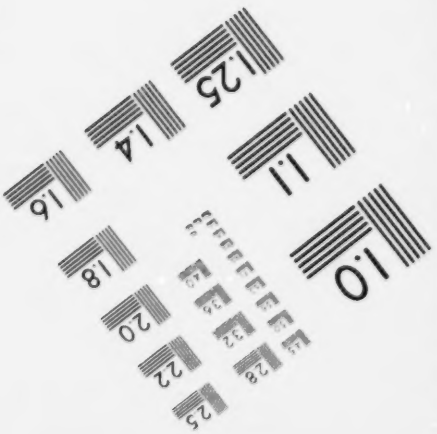
Association for Information and Image Management

1100 Wayne Avenue, Suite 1100
Silver Spring, Maryland 20910

301/587-8202







MANUFACTURED TO AIIM STANDARDS
BY APPLIED IMAGE, INC.

IR

ED 475 183

Situated Cognition: Describing the Theory

Hasan Altalib

George Mason University

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

A. Hasan

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

This document has been reproduced as received from the person or organization originating it.

Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

IR021877

BEST COPY AVAILABLE

INTRODUCTION

The purpose of this paper is to present an overview of the theory of situated cognition by providing its origin, a listing of its main principles and then discussing in detail the principles of, authentic learning environments, legitimate peripheral participation, and assessment. The paper will also provide two examples of the application of situated cognition principles. The first is of communities of practice as an instructional strategy and the way in which it has been applied in the INSITE and I-Learn projects. The second example is of a situated learning and how the CGTV – Jasper Woodbury series has successfully applied the principles of situated learning in its instructional design methodology.

ORIGINS OF SITUATED COGNITION

Situated cognition is an important theory concerning the nature of learning. The theory consists of important implications for the design and development of classroom instruction, including the design of technology or computer based instruction. It is also a learning theory that emphasizes and promotes real and authentic learning. In a situated learning environment, learning of skills and knowledge occur in contexts that reflect how that knowledge is gained and applied in everyday situations (Lave & Wenger, 1991). Nonetheless, some scholars and theorists still argue that the context in which learning takes place is secondary to the actual learning process, it may be useful, however, it remains very distinct and separate in respect to what is being learned.

On the other hand, Brown, et. al. (1989) have revealed through their studies and research on learning, that what is being learned cannot be separated from the context in which it is learned or applied "Rather, it is an integral part of what is learned. Situations might be said to co-produce

knowledge through activity. Learning and cognition, it is now possible to argue, are fundamentally situated." (p. 32)

Proponents of situated cognition further contend and claim that human actions are dependant on the context in which they occur. The theoretical origins of situated cognition are evident in the works of Gibson's theory of affordances and Vygotsky's sociocultural and social learning theories. Gibson (n.d.) proposes that the environment in which one interacts consists of various affordances, which provide the cues that are necessary for perception. Where perception becomes a direct consequence of the properties of the environment. Vygotsky further proposes that social interaction plays a major role in the development of cognition. Vygotsky (1978) states: "every function in the child's cultural development appears twice: first, on the social level, and later, on the individual level; first, between people (interpsychological) and then inside the child (intrapsychological)" (p. 57).

Furthermore, Vygotsky's sociocultural theory contends that an individual's development cannot be understood without reference to the social environment in which the individual is situated (Driscoll, 2000).

PRINCIPLES OF SITUATED COGNITION

Choi and Hannafin (1995) explain that in situated cognition learning cannot be separated from the context in which it occurs, and emphasize the importance of learning in real-life contexts, **whereby** knowledge is acquired by embedding the subject matter in the experiences of the learner and by creating the opportunity for the learner to interact in the context of real life situations. Transfer of learning then occurs when the natural learning environment that is created engages the learner in solving authentic, complex, non-routine problems, which they would likely encounter on the job (Winn, 1993). In further explaining the principles of situated

cognition it is warranted to cite the work of Herrington and Oliver (2000, p. 30-31) who have provided a nine element framework which effectively details the principles of situated cognition and provides some guidelines for implementation,

1. Provide authentic content that reflects the way knowledge will be used in real life - non-linear design, no attempt to simplify.
2. Provide authentic activities - activities that have real world relevance.
3. Provide access to expert performances and the modeling of process - access to social periphery, access to expert thinking.
4. Provide multiple roles and perspectives - the opportunity to express different points of view.
5. Support collaborative construction of knowledge - classroom organization into small groups.
6. Promote reflection - opportunity for learners to compare with experts.
7. Promote articulation - publicly present argument to enable defense of learning.
8. Provide coaching and scaffolding - complex open ended learning environment.
9. Provide for authentic assessment - multiple indicators of learning. (p. 30-31)

AUTHENTIC LEARNING ENVIRONMENTS

Learners are participating in the actual experience (contextualized) rather than being external (decontextualized) to the event. Where learning in context implies constructing an instructional environment that incorporates the tasks that learners must complete in order to be successful in their choice of practice. To be in context implies that learners interact with the values, norms, and true culture of a specific community or organization. Learners must refer to and apply their experiences as a means of participating with and intervening in the social, and material environment in which they are situated (Moore, 1998). Driscoll (2000) acknowledges the importance of learning in context by emphasizing that learners who are learning in familiar contexts are more capable of relating new information than they would be in an unfamiliar context. Brown, et. al. (1989) define authentic activities "as the ordinary practices of the culture" (p. 6). Also as described by Choi and Hannifan (1995) authentic activities are not

simulated tasks or exercises that are usually found in a formal educational setting. They are actual real life activities that experts within the community perform while they are engaged in actual problem-solving situations. Lave, and Wenger (1991) emphasize this point by providing the example of the apprentice tailors who first start by only ironing finished garments, and indicate that even though ironing is a very simple task it still remains absolutely authentic. Therefore, authentic activity becomes important for learners, because it allows them the opportunity to gain access to the expert's perspective within the community and provides them with the ability to act meaningfully and purposefully within the practice (Brown, et. al. 1989)

LEGITIMATE PERIPHERAL PARTICIPATION

According to Lave and Wenger (1991) legitimate peripheral participation views learning as an activity which is situated, whereby learners at some time become participants in communities of practice or practitioners, and move up in the community starting from a new entrant or newcomer all the way to mastery which is in essence full participation. Through this journey within the community newcomers learn skills, acquire knowledge, and understand the artifacts and identities of the community, eventually becoming what are known as old timers. Driscoll (2000) further clarifies that it is a matter of time and experience within the community before a newcomer is allowed or given full access to the community's resources, and illustrates the example of university students who are not fully aware of all the resources and opportunities available to them. Emphasizing the students will only find out about what resources are available through negotiating their way through the system and the university structure. Wenger (1998) as cited in Driscoll (2000) suggests the notion that there are three levels of learning. The first level is the individual learning process in which the learner becomes a member of a community of practice. The second level is the community learning level, where the whole community

structure insures that the progression from newcomer to old-timer is in place. The third level, which pertains to learning on the level of the entire organization, explains that an organization must have the practitioners and resources to be able to sustain the multiple communities operating within its structure.

Brown, et. al., (1989) further argue that legitimate peripheral participation is important for those individuals or learners who do not fully participate directly in a specific activity yet learn from their participation on the periphery. Also that peripheral participation is very important for those entering into a new culture. Where newcomers on the periphery have the opportunity to observe how old timers or practitioners in the community's various levels interact and behave, from which they will understand the rules and culture of the community.

Cognitive apprenticeship is a good example of learning as a process of social interaction, and a good area to explore legitimate peripheral participation. As Lave and Wenger (1991) stated "In the United Sates today much learning occurs in the form of some sort of apprenticeship, especially wherever high levels of knowledge and skill are in demand (e.g., medicine, law)" (p. 63). Where new comers as peripheral participants interact with old timers, they gradually gain skills and knowledge and then become old timers as time passes.

ASSESSMENT IN A SITUATED LEARNING ENVIRONMENT

Adopting a situative learning strategy impacts the way in which learners must be assessed. Many of the traditional standardized tests that are administered, and the instructor constructed exams fall short of being able to effectively measure many important learning outcomes. Greeno (1997) as cited in Driscoll (2000) states that "When students take tests they show how well they can participate in the kind of interaction that the tests afford" (p. 8). From a situated learning and apprenticeship perspective the types of tests referred to fail to measure the

degree in which students were able to effectively participate in the social practices and interactions of a community. Therefore, falling short of measuring the true outcomes of a situated learning environment. Herrington and Oliver (2000) found that students found it far more applicable and effective to be assessed in a real life context. In this particular situation being the assessment provided students the ability to demonstrate learning through actual performance. McLellan (1993) as cited in Driscoll (2000) proposes a three-component model that assess situated learning. The first component is referred to as diagnosis, where instructors or teachers are constantly assessing the learners progress and needs. This particular method is very time consuming and requires a very skilled teacher to perform. The second component is summary statistics, where a computer is employed to perform trend and pattern calculations, to gauge learner performance over time. The third and final component is portfolios, where assessment is mainly focused on gauging the learners understanding of both the process and product of learning. An important characteristic of portfolios is that they allow the learners to select the topics and information that they want to include in their portfolios.

Choi and Hannifan (1995) contend that the content of tests has an impact on both learning and instructional processes. They state that in many cases teachers often "teach to the test" (p. 63). When students eventually realize that they are being tested on their ability to recall the information that the teacher has presented, they start to memorize the required information, which in turn decontextualizes their knowledge, and learning becomes merely learning for the test.

IMPLICATIONS OF THE THEORY ON INSTRUCTION

Communities Of Practice

Communities of practice is a view that learning occurs as an act of membership. The communities of practice concept was pioneered by the Institute for Research on Learning, a spin-off of the Xerox Corporation in Palo Alto, California. Lave and Wenger (1991) argue that communities of practice are not simply a primitive culture sharing entity. They assume that their members have varying and different types of interests, make various contributions to activity, and possess varied opinions. Neither does it imply co-presence, a well-defined, identifiable group, nor does it have socially visible boundaries. It does imply that members participate in an activity system about which all participants share understandings regarding what they are doing and what that means in their lives and for their communities.

Driscoll (2000) further adds that learners or participants may belong to many different communities of practice, and their interaction and participation in these various communities can take on many forms. One form may include non-participation, which may come about as a consequence of the individual being purposely excluded from participation in the community. Wenger (1998) as cited in Driscoll (2000) provides the concept of the five learning trajectories, peripheral, inbound, insider, boundary, and outbound, which help describe and navigate the learner's participation in a community over time. Table 2 illustrates, Wenger's five learning trajectories and defines the form and level of participation for each specific trajectory as explained in Driscoll (2000).

Table 2

Learning Trajectory	Form of Participation
Degree of Participation	

BEST COPY AVAILABLE

Peripheral:	→	Learner never engages in full participation May choose not to seek full participation
Inbound:	→	Learner as a newcomer has invested in the community of practice and is headed towards full participation
Insider:	→	Learner's practices are continually evolving within the community
Boundary:	→	Learner sustains membership and participation in related communities of practice and broker interactions between them
Outbound:	→	Learner is in the process of leaving a community

Predicated on research in the fields of anthropology, education and sociology, Barab and Duffy (2000) found that communities of practice consistently had three main characteristics, a common culture and historical heritage, an interdependent system and a reproduction cycle. In terms of a historical heritage, communities have a significant history; they do not just come together for a simple moment, which may be in response to a specific need. Members within a community come together and share a common historical heritage that captures the shared practices, goals and meanings. Communities also have an interdependent system in which members are participating in something that is larger than the community itself, they work and become interconnected to the community, sharing purpose and identity. The third characteristic, reproduction cycle, refers to the fact that communities are always taking in new comers who at some point come in as peripheral members who then through time become practitioners who guide the community into the future.

As Barab and Duffy (2000) report, INSITE and I-Learn are two good examples of communities of practice that have been successfully implemented within the public school system. The first is INSITE, a collaborative venture that involved two universities, eight school districts, local industry and the Indianapolis Children's Museum. Where the objective was to

offer lessons that would reflect topics of concern to students, not by reintroducing textbook science lessons, but by addressing current real world issues. Where students had access to scientists over a network that answered their questions and engaged them in joint experiments with other students at various schools. I-Learn focused on building international links among K-12 students who are engaged in community and environmental projects. Students obtain support from experts working within the area of interest and participate with scientists in the larger community of environmental science. Through their participation students make contributions to society.

Situated Learning, CGTV - Jasper Woodbury Series

Winn (1993) argues that instructional designers are challenged by two issues when constructing instructional materials for situated learning environments. The first is designing instruction in a way that can help transfer in various types of situations. The second is to try to contextualize the learning of knowledge and skills, by replicating the environment in which it is to be applied. Winn (1993) then suggests that it is possible for instructional designers to fulfill the goals of situated learning in the following three ways "designing worthwhile ways for students to serve "apprenticeships" in school as learners; designing experiences that bring into the classroom activities that are in some way authentic; and planning learning experiences that are situated in the real world" (p.18). Winn (1993) further suggests that in order for students to encounter that same type of reasoning that experts encounter, they must be presented with an authentic, complex, and ill defined task, where the situated learning environment allows the students an opportunity to build awareness and the ability to retrieve the relevant information that they need.

Choi and Hannifan (1995) discuss that the Adventures of Jasper Woodbury, a 12 part series adventure that focuses on mathematical problem solving is a good example of an effective instructionally designed situated learning environment. The series which has been designed and developed by the Cognition and Technology Group (CGTV) at Vanderbilt University, suggests that the main objective of the learning series was for students to experience first hand what it means to develop from a novice with only one single point of view to an expert who is able to interact with an environment from different points of view.

CGTV (2001) explains that each videodisc includes a 17-minute adventure that ends in a complex challenge. The adventures provide students with multiple reasoning and problem solving opportunities, and guide the students in making connections to other subject areas such as literature and science. To be more appealing and authentic the adventures were designed to have the look and feel of a good detective novel, where all the information the students needed to solve the adventure is contained in the story. The series presents a believable story that has interesting characters, a complex and important challenge, and extensions to a variety of subject areas. To solve each adventure, students must apply mathematical concepts and employ problem-solving skills.

CGTV (2001) researchers have observed, as have other researchers in the field of education, that classroom learning is very different from a real or natural learning environment. Natural learning environments provide a real context, authentic tasks, and the ability for students and teachers to share a common frame of reference. Furthermore, in natural learning environments, tasks arise naturally in context and participants have a vested interest in and care about the outcomes.

Finally, the knowledge that is being learned is often viewed as a tool to accomplish the tasks, and the learner sees it as valuable knowledge that can be applied to new situations. The Adventures of Jasper Woodbury are designed to bridge the gap between natural learning environments and traditional school learning environments. They are designed to be used in typical classroom environment, and provide teachers many of the advantages of natural learning environments. They also provide a common context for instruction, and an authentic task (Barab & Duffy, 2000)

CONCLUSION

The theory of situated cognition, in its most general form, has the power to inform instructional designers on several levels both descriptively and prescriptively, in the classroom and in the workforce. It's power is in its flexibility and inclusiveness, the very benefits of an electronically-enabled world in which it arose and will grow in importance. As an educational theory, situated cognition integrates useful principles of sociocultural learning and cognitivism. It sits as an integrating framework that is much more flexible and dynamic than its predecessors as it finally accounts for the interactions pertinent to learning. It makes the important stipulation that information becomes knowledge only in context. It allows us to look at the tools, both cognitive and physical that mediate our actions, the symbols we use to communicate, the social negotiations, the rules, the norms, the culture and history that is formed and informs our communities of practice.

REFERENCES

Brown, J.S., Collins, A., & Duguid, S. (1989). Situated cognition and the culture of learning. Educational Researcher, 18(1), 32-42.

Barab, S., & Duffy, T. (2000) From Practice Fields to Communities of Practice. In D. Jonassen, and S. Land (Eds.), Theoretical Foundations of Learning Environments (pp 25-55). Mahwah, NJ: Lawrence Earlbaum Associates.

Choi, J., & Hannafin, M. (1995). Situated cognition and learning environments: roles, structures, and implications for design. Educational Technology Research and Development, 43(2), 53-69.

Cognition and Technology Group, Vanderbilt University, Peabody College of Education. The adventures of Jasper Woodbury. (n.d.) Retrieved November 6, 2001, from http://peabody.vanderbilt.edu/ctrs/ltc/Research/jasper.html

Driscoll, M. (2000). Psychology of Learning for Instruction, (2nd ed.). Boston, MA: Allyn and Bacon.

Gibson, J. Information Pickup Theory. (n.d.). Retrieved November 2, 2001, from http://tip.psychology.org/gibson.html

Herrington, J., and Oliver, R. (2000). An instructional design framework for authentic learning environments, Educational Technology Research and Development. 48(3), 23-48

Lave, J., and Wenger, E. (1991). Situated learning: legitimate peripheral participation, Cambridge, MA: Cambridge University Press,

Lave, J. (n.d.) Situated Learning. Retrieved November 2, 2001, from http://tip.psychology.org/lave.html

Moore, B.(Fall 1998). Situated cognition versus traditional cognitive theories Of learning. Education, (1), 161.

Vygotsky, L. (1978). Mind in society: The development of higher psychological process. M. Cole, V. John-Steiner, S. Scribuner, E. Souberman (Eds.). Cambridge, MA: Harvard University Press.

Winn, W. (March, 1993). Instructional design and situated learning: paradox or partnership?. Educational Technology, 41(1), 16-20.

U.S. Department of Education
Office of Educational Research and Improvement (OERI)
National Library of Education (NLE)
Educational Resources Information Center (ERIC)

REPRODUCTION RELEASE
(Specific Document)

I. DOCUMENT IDENTIFICATION:

Title: SITUATED COGNITION: DESCRIBING THE THEORY	
Author(s): HASAN ALTALIB	
Corporate Source:	Publication Date:

II. REPRODUCTION RELEASE:

In order to disseminate as widely as possible timely and significant materials of interest to the educational community, documents announced in the monthly abstract journal of the ERIC system, *Resources in Education* (RIE), are usually made available to users in microfiche, reproduced paper copy, and electronic media, and sold through the ERIC Document Reproduction Service (EDRS). Credit is given to the source of each document, and, if reproduction release is granted, one of the following notices is affixed to the document.

If permission is granted to reproduce and disseminate the identified document, please CHECK ONE of the following three options and sign at the bottom of the page.

The sample sticker shown below will be affixed to all Level 1 documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

1

Level 1

☒

Check here for Level 1 release, permitting reproduction and dissemination in microfiche or other ERIC archival media (e.g., electronic) and paper copy.

The sample sticker shown below will be affixed to all Level 2A documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE, AND IN ELECTRONIC MEDIA FOR ERIC COLLECTION SUBSCRIBERS ONLY, HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2A

Level 2A

☐

Check here for Level 2A release, permitting reproduction and dissemination in microfiche and in electronic media for ERIC archival collection subscribers only

The sample sticker shown below will be affixed to all Level 2B documents

PERMISSION TO REPRODUCE AND DISSEMINATE THIS MATERIAL IN MICROFICHE ONLY HAS BEEN GRANTED BY

Sample

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

2B

Level 2B

☐

Check here for Level 2B release, permitting reproduction and dissemination in microfiche only

Documents will be processed as indicated provided reproduction quality permits.
If permission to reproduce is granted, but no box is checked, documents will be processed at Level 1.

I hereby grant to the Educational Resources Information Center (ERIC) nonexclusive permission to reproduce and disseminate this document as indicated above. Reproduction from the ERIC microfiche or electronic media by persons other than ERIC employees and its system contractors requires permission from the copyright holder. Exception is made for non-profit reproduction by libraries and other service agencies to satisfy information needs of educators in response to discrete inquiries.

Signature: H. Altalib	Printed Name/Position/Title: HASAN ALTALIB
Organization/Address: GEORGE MASON UNIVERSITY 1514 CHURCH HILL PLACE, RESTON, VA 20194	Telephone: 703-787-0333 FAX: 703-787-0333 E-Mail Address: HASAN ALTALIB@yahoo.com Date: 9/18/2000

III. DOCUMENT AVAILABILITY INFORMATION (FROM NON-ERIC SOURCE):

If permission to reproduce is not granted to ERIC, or, if you wish ERIC to cite the availability of the document from another source, please provide the following information regarding the availability of the document. (ERIC will not announce a document unless it is publicly available, and a dependable source can be specified. Contributors should also be aware that ERIC selection criteria are significantly more stringent for documents that cannot be made available through EDRS.)

Publisher/Distributor:
Address:
Price:

IV. REFERRAL OF ERIC TO COPYRIGHT/REPRODUCTION RIGHTS HOLDER:

If the right to grant this reproduction release is held by someone other than the addressee, please provide the appropriate name and address:

Name:
Address:

V. WHERE TO SEND THIS FORM:

Send this form to the following ERIC Clearinghouse:

However, if solicited by the ERIC Facility, or if making an unsolicited contribution to ERIC, return this form (and the document being contributed) to:

ERIC Processing and Reference Facility
4483-A Forbes Boulevard
Lanham, Maryland 20706

Telephone: 301-552-4200
Toll Free: 800-799-3742
FAX: 301-552-4700
e-mail: ericfac@inet.ed.gov
WWW: http://ericfacility.org